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**Notice of Allowability**

Application No.

10/065,683

Examiner

Chih-Cheng Glen Kao

Applicant(s)

KEVILLE ET AL.

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/23/05.
2. ☒ The allowed claim(s) is/are 1-35, 37-95, 97-123, 139, 140, 157, 158, 161-168, 177, 178 and 191-202.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                 | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____. | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material           | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jay R. Yablon on 12/2/05.

2. The application has been amended as follows:

In claim 1, line 4, replace "comprising" with - -having- -.

In claim 1, line 6, replace "comprising" with - -having- -.

In claim 1, line 15, delete "are detected to be".

In claim 1, line 16, insert - -are detected,- - after "preconcentration cell".

In claim 1, line 26, delete "are detected to be".

In claim 1, line 27, insert - -are detected,- - after "preconcentration cell".

In claim 15, line 6, replace "material comprising" with - -material having- -.

In claim 18, line 2, replace "comprising" with - -having- -.

In claim 19, line 2, replace "comprising" with - -having- -.

In claim 20, line 3, replace "comprising" with - -having- -.

In claim 21, line 2, replace "comprising" with - -having- -.

In claim 22, line 2, replace "comprising" with - -having- -.

In claim 22, line 18, replace "comprise" with - -having- -.

In claim 23, line 2, replace “comprising” with - -having- -.

In claim 24, line 2, replace “comprising” with - -having- -.

In claim 25, line 2, replace “comprising” with - -having- -.

In claim 26, line 2, replace “film comprising” with - -film having- -.

In claim 27, line 2, replace “film comprising” with - -film having- -.

In claim 28, line 4, replace “comprising” with - -having- -.

In claim 32, line 4, replace “comprising” with - -having- -.

In claim 34, line 2, replace “comprising” with - -having- -.

In claim 35, line 2, replace “comprising” with - -having- -.

In claim 37, lines 3-4, delete “are detected to be”.

In claim 37, lines 4-5, delete “at least one sensitivity data energy channel of”.

In claim 37, line 5, insert - -are detected- - after “preconcentration cell”.

In claim 38, line 4, delete “are detected to be”.

In claim 38, lines 4-5, delete “at least one ion extraction rate data energy channel of”.

In claim 38, line 5, insert - -are detected- - after “preconcentration cell”.

In claim 39, lines 3-4, delete “are detected to be”.

In claim 39, lines 4-5, delete “at least one background data energy channel of”.

In claim 39, line 5, insert - -are detected- - after “preconcentration cell”.

In claim 39, lines 8-9, delete “are detected to be”.

In claim 39, lines 9-10, delete “at least one sensitivity data energy channel of”.

In claim 39, line 10, insert - -are detected- - after “preconcentration cell”.

In claim 39, line 17, delete “are detected to be”.

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In claim 39, lines 17-18, delete “at least one ion extraction rate data energy channel of”.

In claim 39, line 18, insert - -are detected- - after “preconcentration cell”.

In claim 40, lines 4-5, delete “are detected to be”.

In claim 40, line 5, delete “at least energy channel of”.

In claim 40, line 6, insert - -are detected,- - after “preconcentration cell”.

In claim 42, lines 4-5, delete “are detected to be”.

In claim 42, line 5, delete “at least one energy channel of”.

In claim 42, line 6, insert - -are detected,- - after “preconcentration cell”.

In claim 62, line 19, replace “an an” with - -an- -.

In claim 62, lines 22-23, delete “are detected to be”.

In claim 62, line 23, insert - -are detected,- - after “preconcentration cell”.

In claim 62, line 34, insert a semi-colon after “said electrodes”.

In claim 62, lines 36-37, delete “are detected to be”.

In claim 62, line 37, insert - -are detected- - after “preconcentration cell”.

In claim 75, line 6, replace “material comprising” with - -material having- -.

In claim 82, line 3, replace “comprising” with - -having- -.

In claim 82, line 18, replace “comprise” with - -having- -.

In claim 83, line 3, replace “comprising” with - -having- -.

In claim 84, line 3, replace “comprising” with - -having- -.

In claim 85, line 3, replace “comprising” with - -having- -.

In claim 86, line 4, replace “comprising” with - -having- -.

In claim 87, line 4, replace “comprising” with - -having- -.

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In claim 88, line 5, replace “comprising” with - -having- -.

In claim 92, line 5, replace “comprising” with - -having- -.

In claim 97, line 10, delete “are detected to be”.

In claim 97, lines 10-11, delete “at least one sensitivity data energy channel of”.

In claim 97, line 11, insert - -are detected- - after “preconcentration cell”.

In claim 98, line 16, delete “are detected to be”.

In claim 98, lines 16-17, delete “at least one ion extraction rate data energy channel of”.

In claim 98, lines 17-18, insert - -are detected- - after “preconcentration cell”.

In claim 99, line 7, delete “are detected to be”.

In claim 99, lines 7-8, delete “at least one background data energy channel of”.

In claim 99, line 8, insert - -are detected- - after “preconcentration cell”.

In claim 99, line 16, delete “are detected to be”.

In claim 99, lines 16-17, delete “at least one sensitivity data energy channel of”.

In claim 99, line 17, insert - -are detected- - after “preconcentration cell”.

In claim 99, line 31, delete “are detected to be”.

In claim 99, lines 31-32, delete “at least one ion extraction rate data energy channel of”.

In claim 99, lines 32-33, insert - -are detected- - after “preconcentration cell”.

In claim 100, line 12, delete “are detected to be”.

In claim 100, lines 12-13, delete “at least one test data energy channel of”.

In claim 100, line 13, insert - -are detected- - after “preconcentration cell”.

In claim 102, line 12, delete “are detected to be”.

In claim 102, lines 12-13, delete “at least one test data energy channel of”.

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In claim 102, line 13, insert - -are detected- - after “preconcentration cell”.

In claim 139, line 4, replace “comprising” with - -having- -.

In claim 139, line 6, replace “comprising” with - -having- -.

In claim 139, line 16, replace “comprising” with - -having- -.

In claim 140, line 4, replace “comprising” with - -having- -.

In claim 140, line 6, replace “comprising” with - -having- -.

In claim 140, line 18, replace “comprising” with - -having- -.

In claim 157, line 19, replace “comprising” with - -having- -.

In claim 158, line 22; replace “comprising” with - -having- -.

In claim 161, line 4, replace “electrode comprising” with - -electrode having- -.

In claim 161, line 6, replace “comprising” with - -having- -.

In claim 165, line 4, replace “electrode comprising” with - -electrode having- -.

In claim 165, line 6, replace “comprising” with - -having- -.

In claim 177, line 4, replace “electrode comprising” with - - electrode having- -.

In claim 177, line 6, replace “comprising” with - -having- -.

In claim 177, line 10, replace “comprising” with - -having- -.

In claim 177, line 26, replace “comprise” with - -having- -.

In claim 178, line 4, replace “comprises” with - -having- -.

In claim 191, line 4, replace “comprising” with - -having- -.

In claim 191, line 6, replace “comprising” with - -having- -.

In claim 199, line 4, replace “comprising” with - -having- -.

In claim 199, line 6, replace “comprising” with - -having- -.

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In claim 201, line 4, delete “are detected to be”.

In claim 201, lines 4-5, delete “at least one background data energy channel of”.

In claim 201, line 5, insert - -are detected- - after “preconcentration cell”.

In claim 202, line 7, delete “are detected to be”.

In claim 202, lines 7-8, delete “at least one background data energy channel of”.

In claim 202, line 8, insert - -are detected- - after “preconcentration cell”.

### ***Reasons for Allowance***

3. Claims 1-35, 37-95, 97-123, 139, 140, 157, 158, 161-168, 177, 178, and 191-202 are allowed. The following is an examiner’s statement of reasons for allowance.

4. Regarding claim 1, prior art fails to disclose or fairly suggest a system for identifying and measuring concentrations of elements in fluids including a computerized apparatus deducing an identity, or measurement of concentration, of an unknown concentration of at least one element of interest in a fluid of interest, based on comparing calibration data with test data related to a rate at which photons emitted from a preconcentration cell are detected, based on said fluid of interest with said unknown concentration being flowed at a known flow rate through a central flow interelectrode gap for a known period of time, a known voltage differential being applied across electrodes, and said preconcentration cell being exposed to x-rays, in combination with all the limitations in the claim. Claims 2-35, 37-61, 122, and 201 are allowed by virtue of their dependency.

5. Regarding claim 62, prior art fails to disclose or fairly suggest a method for identifying and measuring concentrations of elements in fluids, including the steps of deducing an identity, or measurement of concentration, of an unknown concentration of at least one element of interest in a fluid of interest, based on comparing calibration data with test data related to a rate at which photons emitted from a preconcentration cell are detected, based on said fluid of interest with said unknown concentration flowing through a central flow interelectrode gap at a known flow rate for a known period of time together with applying a known voltage differential and exposing a cell to x-rays, in combination with all the limitations in the claim. Claims 63-95, 97-121, 123, and 202 are allowed by virtue of their dependency.

6. Regarding claims 139 and 157, prior art fails to disclose or fairly suggest a system and method for detecting and measuring concentrations of elements in fluids including an upper transmission window comprising an atomic number below 10, structural rigidity to support up to 1/10 atm. of pressure without bowing more than approximately 100 microns, substantial impermeability relative to fluid, x-ray transparency greater than 90% for characteristic photon energies from an element of interest for which a fluidic concentration is to be measured, x-ray scattering therefrom minimized to less than approximately 10% of radiation scattered from a column of fluid equal to one optical depth in the fluid of a characteristic photonic energy from an element of interest for which a fluidic concentration is to be measured, and freedom from any single contaminant in excess of 1 part per million, when measured by x-ray fluorescence, in combination with all the limitations in each respective claim.



7. Regarding claims 140 and 158, prior art fails to disclose or fairly suggest a system and method for detecting and measuring concentrations of elements in fluids including a lower transmission window comprising an atomic number below 10, structural rigidity to support up to 1/10 atm. of pressure without bowing more than approximately 100 microns, substantial impermeability relative to fluid, x-ray transparency greater than 90% for characteristic photon energies from an element of interest for which a fluidic concentration is to be measured, x-ray scattering therefrom minimized to less than approximately 10% of radiation scattered from a column of fluid equal to one optical depth in the fluid of a characteristic photonic energy from an element of interest for which a fluidic concentration is to be measured, and freedom from any single contaminant in excess of 1 part per million, when measured by x-ray fluorescence, in combination with all the limitations in each respective claim.

8. Regarding claim 161, prior art fails to disclose or fairly suggest a method including optimizing an upper high surface area electrode with an upper electrode thickness less than or equal to approximately an optical depth 1 of said upper high surface area electrode when wetted with a fluid to be flowed through a cell, in combination with all the limitations in the claim. Claims 162-164 are allowed by virtue of their dependency.

9. Regarding claim 165, prior art fails to disclose or fairly suggest a method including optimizing an upper high surface area electrode with an upper electrode thickness less than or equal to approximately an optical depth 1 of said upper high surface area electrode when wetted with an element of interest for which a fluidic concentration is to be measured by a cell, in a fluid

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to be flowed through said cell, in combination with all the limitations in the claim. Claims 166-168 are allowed by virtue of their dependency.

10. Regarding claim 177, prior art fails to disclose or fairly suggest a method including optimizing an interelectrode gap range specified by:

$$d = \frac{\sigma \Phi}{q \varepsilon} \frac{w_i}{w_f} \frac{A}{n_f C F} \times 100\% \approx 2 \times 10^{-9} \frac{\Phi w_i A}{q \varepsilon w_f n_f F} \times 100\% \propto \frac{\sigma A}{\varepsilon F},$$

in combination with all the limitations in the claim. Claim 178 is allowed by virtue of its dependency.

11. Regarding claims 191 and 195, prior art fails to disclose or fairly suggest a system and method for detecting and measuring concentrations of elements in fluids including flow control means to maintain  $\varepsilon$  below approximately 5% for at least one element of interest, in combination with all the limitations in each respective claim. Claims 192-194 and 196-198 are allowed by virtue of their dependency.

12. Regarding claims 199 and 200, prior art fails to disclose or fairly suggest an apparatus or method for identifying and measuring concentrations of elements in fluids including time control means for flowing fluid for a time  $t$  given by

$$t \propto \frac{S I}{\sigma} \propto \frac{S I}{C},$$

in combination with all the limitations in each respective claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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